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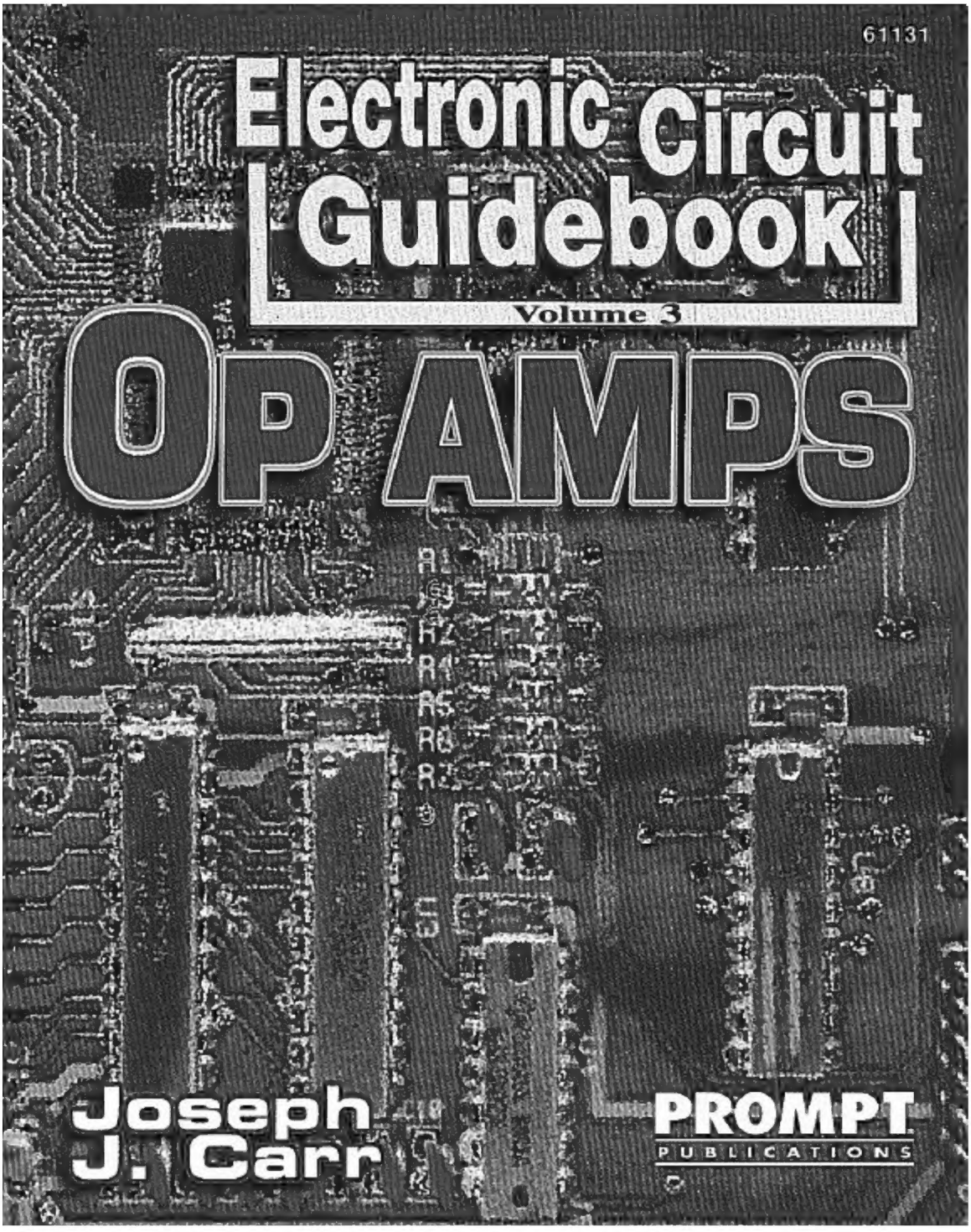

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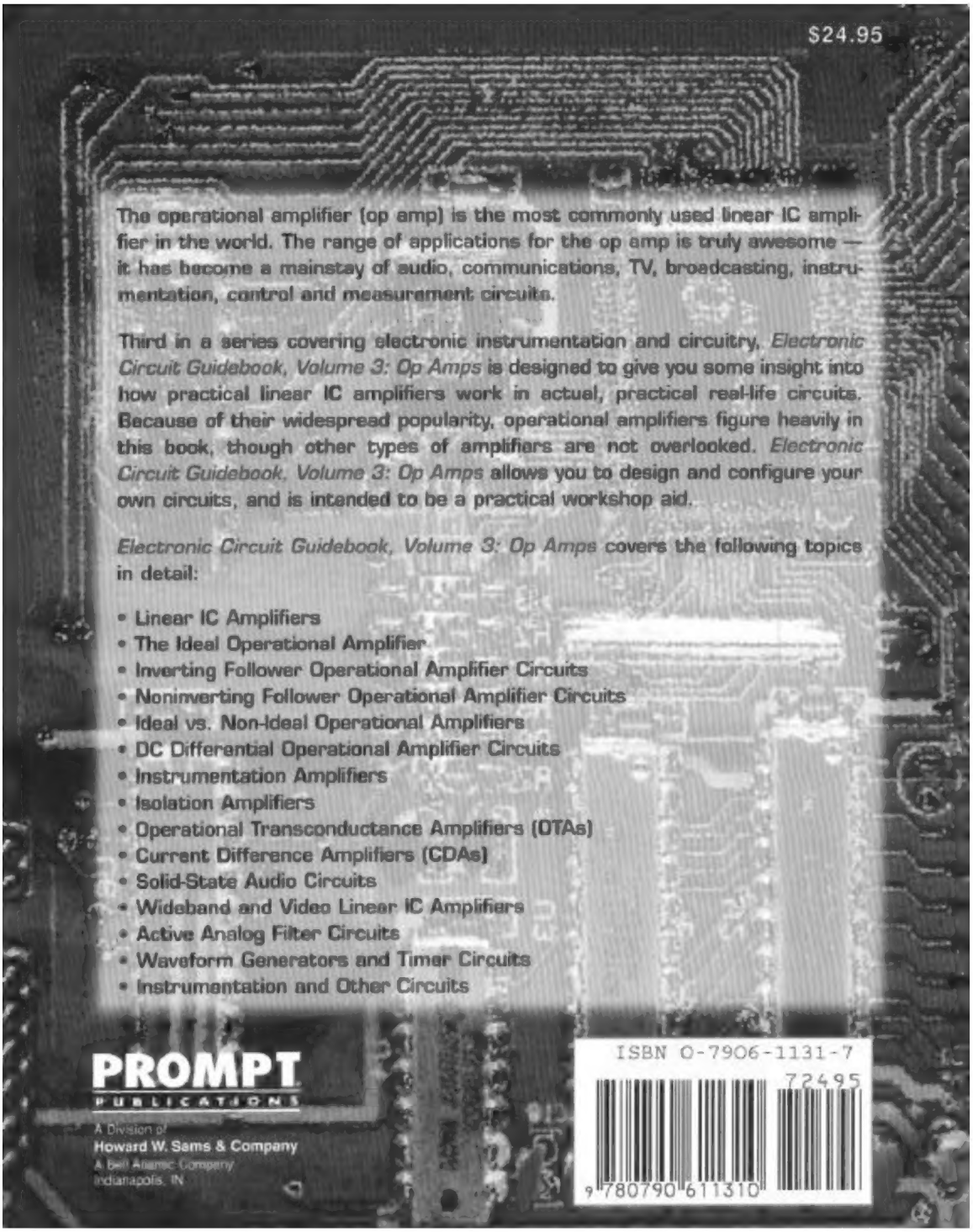
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The operational amplifier (op amp) is the most commonly used linear IC amplifier in the world. The range of applications for the op amp is truly awesome — it has become a mainstay of audio, communications, TV, broadcasting, instrumentation, control and measurement circuits.
Third in a series covering electronic instrumentation and circuitry, Electronic Circuit Guidebook, Volume 3: Op Amps is designed to give you some insight into how practical linear IC amplifiers work in actual, practical real-life circuits. Because of their widespread popularity, operational amplifiers figure heavily in this book, though other types of amplifiers are not overlooked. Electronic Circuit Guidebook, Volume 3: Op Amps allows you to design and configure your own circuits, and is intended to be a practical workshop aid.
Electronic Circuit Guidebook, Volume 3: Op Amps covers the following topics in detail:
• Linear IC Amplifiers
• The Ideal Operational Amplifier
• Inverting Follower Operational Amplifier Circuits
• Noninverting Follower Operational Amplifier Circuits
• Ideal vs. Non-Ideal Operational Amplifiers
• DC Differential Operational Amplifier Circuits
• Instrumentation Amplifiers
• Isolation Amplifiers
• Operational Transconductance Amplifiers (OTAs)
• Current Difference Amplifiers (CDAs)
• Solid-State Audio Circuits
• Wideband and Video Linear IC Amplifiers
• Active Analog Filter Circuits
• Waveform Generators and Timer Circuits
• Instrumentation and Other Circuits
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Preface

Electronics is a fascinating field, and has been popular ever since the very early days of radio (early 1900s). The typical electronic and radio hobbyist has always been something of an activist elite who experiments with practical circuits, designs personal projects, and builds everything from simple, "one-evening" jobs to complex systems that take months to complete. Personally, I've built projects from simple crystal set radios to large and complex instruments. I've even seen a large computer-driven X-Y plotter project advertised in the magazines just recently, indicating that hobby construction is still very popular. This book is designed for electronic hobbyists and others who enjoy learning about or building fundamental electronic circuits.

At one time all electronic projects were composed of discrete components such as resistors, capacitors, transistors and vacuum tubes. In the early 1960s, a great change -- what some today would call a paradigm shift -- in electronic construction occurred with the advent of integrated circuitry. The first commercial ICs (integrated circuits), devices such as the µA-709 operational amplifier and the µA-703 FM IF amplifier that elicited excitement in their day, are now considered not only over the hill, but out of sight behind us. These devices are small-scale integration and extremely primitive compared with products sold today. However, in 1967, the early devices were the latest and greatest -- with prices commensurate with that status.

Since those early days, we have progressed through several orders of integration, where we now commonly see medium-scale integration (MSI), largescale integration (LSI) and very large-scale integration (VLSI) devices sold through nonindustrial distributors and hobbyist-oriented parts stores such as Radio Shack. Now on the market are monolithic microwave integrated circuit (MMIC) devices, such as the Mini-Circuits Laboratories MAR-xx series.

The purpose of this book is to give you some insight into how practical linear ICs work in actual, practical real-life circuits. Because of their widespread popularity, operational amplifiers (op amps) figure heavily in the presentation, although other types of amplifiers are not overlooked. The idea is to allow you to design and configure your own circuits, and the material is presented with that goal in mind.

Whatever else this book is, it is intended to be a practical workshop aid. Although most authors probably like to see their works given a place of honor in their reader's library, on the bookshelf in the living room for instance, it is my desire that this book be kept on your workbench, get folded over from long and hard use, and (of course) amply solder splashed.